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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/606,633	06/25/2003	John M. Heck	42P16641	4995

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EXAMINER
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NGUYEN, HOA CAO

ART UNIT	PAPER NUMBER
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2841

DATE MAILED: 11/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/606,633	<b>Applicant(s)</b> HECK ET AL.	
	<b>Examiner</b> Hoa C. Nguyen	<b>Art Unit</b> 2841	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 October 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.  
4a) Of the above claim(s) 19-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

1. The amendment filed on 26 October 2005 has been entered. Applicants have amended the specification, claim 1, and claim 8 and claims 19-26 are cancelled without prejudice.

#### ***Specification***

2. The specification, the amendment on page 7, line 4, was also received. Applicants' arguments have been fully considered and are persuasive. The specification is approved.

#### ***Claim Objections***

3. The applicants' arguments have been fully considered and are persuasive. The claim objections have been withdrawn.

#### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-2, 8-11, and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Hinz et al. (U.S. Patent 6,559,530).

**Regarding claim 1**, as shown in figure 3b, Hinz et al. discloses an apparatus comprising:

Art Unit: 2841

(a) A Micro-electromechanical system (MEMS) module including at least one MEMS device 50 and a cap 58 (lid) covering the at least one MEMS device, see column 3, lines 43 and 46;

(b) at least one contact 70 (solder ball) mounted to a bottom of the MEMS module (wherein the bottom is arbitrary defined as the cap side), see column 4, line 10; and

(c) at least one via 59 to pass vertically through the cap to electrically couple the at least one MEMS device to the contact, see column 3, lines 47-48 and column 4, lines 7-9.

**Regarding claim 2**, Hinz et al. discloses the at least one MEMS device 50 comprises a MEMS RF switch array inherently including at least one switch, see column 1, lines 14-16.

**Regarding claim 8**, Hinz et al. discloses a seal ring (no number) to couple the cap 58 to a section 60 (seal area) of the MEMS module, wherein the section of the MEMS module include the at least one MEMS device 50, see column 3, lines 47-52 and column 4, lines 14-19.

**Regarding claim 9**, Hinz et al. discloses a printed circuit board 68 (beside a printed circuit board 56, substrate 68 is technically a PCB containing one or more non-MEMS devices 66) coupled to the contact 70, see column 4, lines 1-7.

**Regarding claim 10**, Hinz et al. disclose every limitation as shown in claims 1 and 2 above.

**Regarding claim 11**, Hinzel et al. disclose every limitation as shown in claim 8 above.

**Regarding claim 18**, Hinzel et al. disclose every limitation as shown in claim 9 above.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 3-7 and 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hinzel et al. in view of Huang et al. (US 6384353).

**Regarding claims 3-7**, Hinzel et al. disclose every limitation as shown in claims 1-2 above, but failed to disclose:

- (a) An input, an output, and an actuation terminal (the limitation of claim 3);
- (b) how the terminals are connected to the vias (the limitation of claim 4);
- (c) how the vias are connected to the contacts (the limitation of claim 5);

(d) a trace ring to couple the at least one MEMS device to a first via (the limitation of claim 6); and

(e) the trace ring surrounds at least a portion of the at least one MEMS device, (the limitation of claim 7).

Huang et al., as shown in figure 5, discloses an apparatus comprising a MEMS module having at least one MEMS device 100, a plurality of contacts 127, 129, and 130 mounted to a bottom of the MEMS module, and a plurality of vias 140 pass vertically through a portion of the MEMS module to electrically couple the at least one MEMS device to the contacts, see abstract and column 2, lines 51-54.

Huang et al. further disclose:

(a) Input and output terminals 122 and actuation terminals 121 each electrically coupled to the MEMS device 100, see figures 5 and 6 and column 3, lines 2-5;

(b) the input terminal 122 electrically coupled to a first via of the plurality of vias 140, the output terminal 122 (same reference number) is electrically coupled to a second via of the plurality of vias 140 (same reference number), and the actuation terminal 121 is electrically coupled to a third via of the plurality of vias 140, see figure 4 and column 2, line 62 continuing column 3, line 6;

(c) the first via is electrically coupled to a first contact of the plurality of contacts 130, the second via is electrically coupled to a second contact of the plurality of contacts 130, and the third via is electrically coupled to a third contact 127 mounted to the bottom of the MEMS module, see figure 4 and column 2, lines 52-55;

(d) a trace ring 134 to couple the MEMS device 100 to the first via of the plurality of vias 140, see figures 5 and 6, column 3, lines 28-30; and

(e) the trace ring surrounds at least a portion of the MEMS device to allow a signal to transit the MEMS module using a second via of the plurality of vias without crossing the trace ring, see figure 6.

It would have been obvious to one of ordinary skill in the art at the time of invention was made to apply the connections as taught by Huang et al. on the MEMS module of Hinzl et al. in order to function the MEMS device.

**Regarding claims 12 and 13**, Hinzl et al. disclose every limitation as shown in claims 10 above except that the cap section comprises silicon or ceramic. However, Hinzl et al. does disclose the coefficient of thermal expansion should be about equal between the cap and the substrate 52 where the cap is bonded, see column 3, lines 54-56.

It would have been obvious to one of ordinary skill in the art at the time of invention was made to have the cap section comprising either ceramic or silicon or any other material in order to match the thermal coefficient expansion of the substrate 52 where the cap is bonded to.

**Regarding claim 14**, Hinzl et al. and further in view of Huang et al. disclose every limitation as shown in claims 10 and 4 above.

**Regarding claim 15**, Hinzl et al. discloses a plurality of MEMS switches array 50 and at least two MEMS devices are shown in figure 3b. It is inherently that each RF switch array needs a separate input and a separate actuation terminal for controlling the

RF switch array and only one output terminal is needed for transmitting a RF signal to an antenna. Therefore, a second RF switch array must be electrically coupled to a second input terminal of the plurality of terminals 122 and to a second actuation terminal of the plurality of terminals 121, and the output of the second RF switch array is also electrically coupled to the output terminal of the first RF switch array; and the limitation of the interconnections has been discussed in claims 3-7 above. Thus, Hinz et al. and further in view of Huang et al. anticipate the claim.

**Regarding claims 16 and 17**, Hinz et al. and further in view of Huang et al. discloses every limitation as shown in claim 3-7 above.

#### ***Response to Arguments***

9. Applicants' arguments about the claim rejections, filed on 26 October 2005, have been fully considered but they are moot in view of the new grounds of rejection with the same prior art.

#### ***Conclusion***

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of



Art Unit: 2841

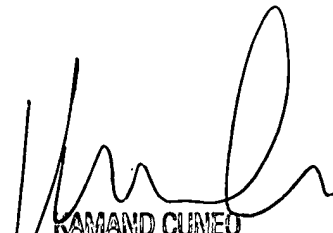
the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoa C. Nguyen whose telephone number is 571-272-8293. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 571-272-1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Hoa C. Nguyen  
15 November 2005



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